

## For Reference

---

BE TAKEN FROM THIS ROOM



Digitized by the Internet Archive  
in 2018 with funding from  
University of Alberta Libraries

<https://archive.org/details/predictivevalueo00walt>

THE UNIVERSITY OF ALBERTA

THE PREDICTIVE VALUE OF THE MEDICAL APTITUDE TEST  
IN THE UNIVERSITY OF ALBERTA SCHOOL OF MEDICINE

A THESIS  
SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES  
IN FULFILMENT OF THE REQUIREMENTS FOR  
THE DEGREE OF MASTER OF ARTS

FACULTY OF EDUCATION

BY  
WALTER ALLISTER SCOTT

EDMONTON, ALBERTA

MAY, 1945.



Thesis

1945

#17



## TABLE OF CONTENTS

	Page
LIST OF TABLES	iv
LIST OF FIGURES	vi
Chapter	
I. PURPOSE OF THIS INVESTIGATION	1
II. MATERIALS, SUBJECTS, AND METHODS	3
Materials - The Test	
Object of the Test	
History of the Test	
Numbers Taking the Test	
Analysis of Tests used at the	
University of Alberta	
Subjects	
Methods	
III. SUMMARY OF DATA	19
Correlations	
Distribution of Total Scores	
Medical Aptitude Test Scores of Students	
failing in one or more Subjects in	
Medical School	
Comparison of Scholastic Achievement with	
Medical Aptitude Test Scores	
Comparison between Percentile Ratings on	
Medical Aptitude Test and Scholastic	
Achievement	
Comparison of Medical Aptitude Test Scores	
with Scholastic Achievement	
Medical Aptitude Test Scores of those who	
entered Medical School as compared with	
those who did not enter	
Medical Aptitude Test Scores and Scholastic	
Achievement of Students in terms of	
Achievement on the Thurstone Psycho-	
logical Examination	
IV. ANALYSIS OF DATA	34
Correlations	
Distribution of Total Scores	





Medical Aptitude Test Scores of Students failing in one or more Subjects in Medical School	
Comparison of Scholastic Achievement with Medical Aptitude Test Scores	
Comparison between Percentile Ratings on Medical Aptitude Test and Scholastic Achievement	
Comparison of Medical Aptitude Test Scores with Scholastic Achievement	
Medical Aptitude Test Scores of those who entered Medical School as compared with those who did not enter	
Medical Aptitude Test Scores and Scholastic Achievement of Students in terms of Achievement on the Thurstone Psycho- logical Examination	

V. OTHER INVESTIGATIONS ON THE MOSS APTITUDE TEST	58
VI. CONCLUSIONS	64



# LIST OF TABLES

	Page
I. Summary of Number of Tests Given	5
II. Summary of Number of Tests Given at the University of Alberta	7
III. Correlation between Medical Aptitude Test Scores and Scholastic Achievement	19
IV. Distribution of Total Scores	22
V. Medical Aptitude Test Scores of Students failing Subjects in Medical School	23
VI. Medical School Performance in First Year Medicine at Various Aptitude Test Score Levels	25
VII. Medical School Performance in Second Year Medicine at Various Aptitude Test Score Levels	26
VIII. Medical School Performance for First Two Years of Medicine at Various Aptitude Test Score Levels	26
IX. Comparison between Percentile Ratings on Medical Aptitude Tests and Scholastic Achievement for First Year Medicine	27
X. Comparison between Percentile Ratings on Medical Aptitude Tests and Scholastic Achievement for Second Year Medicine	28
XI. Comparison between Percentile Ratings on Medical Aptitude Tests and Scholastic Achievement for First Two Years of Medicine	28
XII. Comparison of Medical Aptitude Test Scores with Scholastic Achievement for First Year Medicine	29
XIII. Comparison of Medical Aptitude Test Scores with Scholastic Achievement for Second Year Medicine	30
XIV. Medical Aptitude Test Scores of those who entered Medical School as compared with those who did not enter ( U.of A.)	31



	Page
XV. Medical Aptitude Test Scores and Scholastic Achievement of First Year Medicine Group compared with Psychological Test Ratings	32
XVI. Medical Aptitude Test Scores and Scholastic Achievement of Second Year Medicine Group compared with Psychological Test Ratings	33



## LIST OF FIGURES

Figure	Page
1. Percentage of Freshmen who have taken Medical Aptitude Test	6
2. Comparison of Medical Aptitude Test Scores of Students failing in one or more Subjects in First Year Medicine	37
3. Comparison of Medical Aptitude Test Scores of Students failing in one or more Subjects in Second Year Medicine	38
4. Comparison of Medical Aptitude Test Scores of Students failing in one or more subjects in Third Year Medicine	40
5. Comparison of Medical Aptitude Test Scores of Students failing in one or more Subjects in Fourth Year Medicine	41
6. Comparison of Scholastic Achievement for First Year Medicine with Medical Aptitude Test Scores	42
7. Comparison of Scholastic Achievement for First Year Medicine with Medical Aptitude Test Scores, showing Distribution of marks over 80% and below 60%	43
8. Comparison of Scholastic Achievement for Second Year Medicine with Medical Aptitude Test Scores	45
9. Comparison of Scholastic Achievement for Second Year Medicine with Medical Aptitude Test Scores, showing Distribution of marks over 80% and below 60%	46
10. Comparison of Scholastic Achievement for First and Second Year Medicine with Medical Aptitude Test Scores	47
11. Comparison between Percentile Ratings on Medical Aptitude Test and Scholastic Achievement for First Year Medicine	48





12.	Comparison between Percentile Ratings on Medical Aptitude Test and Scholastic Achievement for Second Year Medicine	50
13.	Comparison between Percentile Ratings on Medical Aptitude Test and Scholastic Achievement for First Two Years of Medicine	51
14.	Comparison of Medical Aptitude Test Scores with Scholastic Achievement in First Year Medicine	52
15.	Comparison of Medical Aptitude Test Scores with Scholastic Achievement in Second Year Medicine	53
16.	Medical Aptitude Test Scores and Scholastic Achievement for First Year Medicine compared with Psychological Test Ratings	55
17.	Medical Aptitude Test Scores and Scholastic Achievement for Second Year Medicine compared with Psychological Test Ratings	56



## CHAPTER I

### PURPOSE OF THIS INVESTIGATION

The purpose of this study is, primarily, to determine the degree of correlation existing between scores on the Moss Aptitude Test for Medical Schools made by premedical students and their success measured in terms of scholastic achievement in the four years of medical work at the University of Alberta.

The Moss Aptitude Test was developed by a committee under the direction of Dr. F. A. Moss, Columbia Medical Building, Washington, D.C. The work of the committee is sponsored by the Association of American Medical Colleges.

If a limited number of medical students must be chosen from among many applicants, the schools want to choose the most promising. Even where limitation of numbers is not urgent, it would still be desirable to identify and refuse admission to those applicants who are certain to fail in the medical course. Scientific selection of students would greatly reduce the time, money, and effort involved when students fail. The elimination of unsatisfactory students would enable the medical schools to give better tuition to those who are admitted.

One source of difficulty is the confusion between the problem of selecting individuals who will be successful as medical students, and the problem of selecting those who will be successful as doctors. There is no clear cut basis



for distinguishing between good and poor doctors. Annual income, prestige in the profession, or opinion of patients cannot be used as scientific criteria of differentiation. There is, however, an objective criterion of success in medical school, namely, academic grades. This investigation concerns a method which aims to select individuals who will be successful medical students.

In this study, the records of six successive classes entering the University of Alberta from 1934 to 1939 were used. When this investigation was begun, the first two classes had had time to complete their four years of medicine. In all, the records of 211 who have taken the Aptitude Test for Medical Schools are included. However, only 129 of these completed first year medicine. The rest took the test and then failed to enter or dropped out during the first year.

During these years, 1934 to 1939, students were admitted to the medical school at the University of Alberta on the basis of academic standing and of personal interviews by the Dean or other member of the Faculty of Medicine. Results obtained by students on the Medical Aptitude Test were not used for admission purposes.

At the outset it must be admitted that this study concerns a relatively small number of students. Nevertheless, the results are presented for whatever value may be derived from them.



## CHAPTER II

### MATERIALS, SUBJECTS, AND METHODS

#### Materials - The Test

Object of the Test.- The Aptitude Test for Medical Schools was designed for one purpose, namely, to predict whether a given student will be able to complete the full course in medical school. If the test fulfils its objective, then it would be of considerable help in selecting medical students.

The test is distinctly a scholastic aptitude test. No claim has been made that it will measure how well a student will succeed in his medical career after finishing school.

History of the Test.- Before the test was used, the failure rate of students in medical schools in the United States was excessively high. In 1927, sixteen of the graduating class of seventy-two in one medical school failed, and inasmuch as the students who failed were unable to utilize the very expensive training which they had received, it was considered unfair not only to them, but also to the taxpayers to let such a condition exist. On further examination it was found that there were apparently twice as many students applying for admission to the various medical schools each year as there were places for them, and it was clear that if some means could be devised to aid in the







selection of the best 50 per cent it would be advantageous to all concerned.

After more than a year of experimental work in one medical school under the supervision of Dr. F. A. Moss arrangements were made in 1928 to extend the experiment to fourteen other medical schools, and in the next year to seventy. At the annual meeting of the Association of American Medical Colleges in 1930 the Moss Aptitude Test was adopted on an experimental basis by the Association as a normal requirement for entrance. The Moss Aptitude Test for Medical Schools is sponsored and administered by the Association of American Medical Colleges.

In the early experiments, the test was given to students shortly after they entered medical school. Correlations were then made between the test scores of students and corresponding grades for the freshman year to determine the predictive value of the test. Beginning with 1931, however, all the tests were given in premedical schools. After the test papers were graded and tabulated, the results were sent to the admission officers of medical schools to be used as possible aids in the selection of students.

Numbers Taking the Test.- Since 1928, when the test was first used, a different form of the test has been given each year. It is assumed that the different forms of the test are of equal difficulty. During the time that the test has been used, there has been an increase in the number of



students taking the test. Table I shows the number of tests given each year since the work was started. It is noted that the number of tests given the last six years has stabilized around 10,500 tests a year.

TABLE I  
SUMMARY OF NUMBER OF TESTS GIVEN

Form	Date	Number of Tests	Number of Schools
1	1928-1929	1552	In medical school
2	1929-1930	5916	In medical school
3	Feb. 1931	9220	547 premedical schools
4	Dec. 1931	9173	537 " "
5	Dec. 1932	9398	546 " "
6	Dec. 1933	9914	636 " "
7	Dec. 1934	10569	615 " "
8	Dec. 1935	10671	624 " "
9	Dec. 1936	10853	627 " "
10	Dec. 1937	10755	628 " "
11	April 1938		
12	Dec. 1938	10411	621 " "
13	Dec. 1939	10459	623 " "

While there has been a slight decrease in the last years in the number of tests given, there has been a steady increase in the percentage of students in medical schools



who have taken the test. It would thus appear that an increasing amount of attention is being given to the test by the admission officers of most of the medical schools. Figure 1 shows the percentage of freshmen entering medical schools who have taken the Medical Aptitude Test.

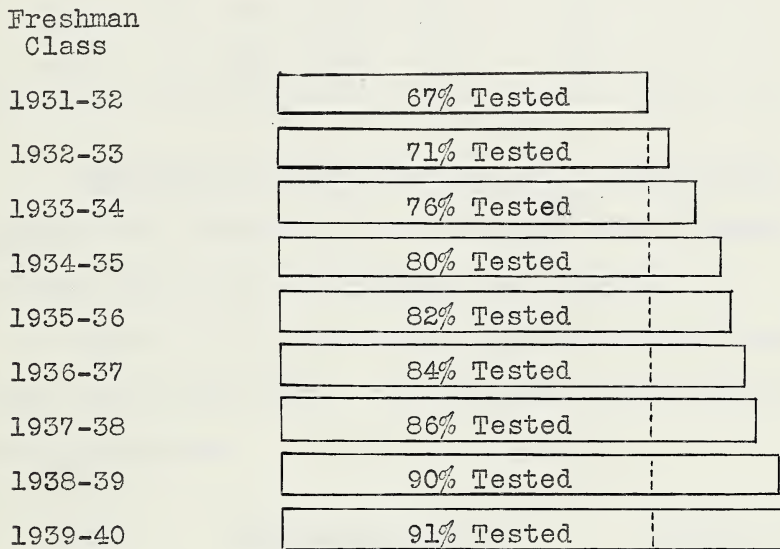


Figure 1. - Percentage of Freshmen who have taken Medical Aptitude Test.

The test was first used by the University of Alberta in 1934. Table II shows the number of tests given to students at this university each year since the work was started.



TABLE II

## SUMMARY OF NUMBER OF TESTS GIVEN AT THE UNIVERSITY OF ALBERTA

Form	Date	Number of Tests
7	Dec. 1934	39
8	Dec. 1935	30
9	Dec. 1936	35
10	Dec. 1937	61
12	Dec. 1938	46
13	Dec. 1939	68

Analysis of Tests used at the University of Alberta.- The following is an analysis of the tests on the forms used at the University of Alberta.

Form 7 of the Aptitude Test for Medical Schools was the first form used. It contained seven separate tests scored as follows:

<u>Test</u>	<u>Method of Scoring</u>	<u>Total Possible</u>
1	R-W (Right minus Wrong)	40
2	No. 'R (Right)	25
3	R-W	25
4	R-W	40
5	R-W x 2	40
6	No. R	90
7	No. R x 3	30
Total		290





Test 1 was designed to measure how well a student could understand and retain the principal facts in a passage on inflammation such as he would find in the usual course in Pathology in medical school. After he had studied this passage for fifteen minutes, he was required to answer forty questions in true-false form about it. The fifteen minutes gave him time to read the passage over at least two or three times. Other things being equal, it would seem logical that those who learn such a passage best under these conditions would also learn similar passages best in the normal medical course.

Tests 2 and 3, like Test 1, were based on the student's ability to learn specific material in a given length of time. In this instance he had an anatomical drawing with a written discussion of it. The drawing was similar to those the student would meet in the first term of the course in anatomy. The tests were designed to measure his ability to visualize and remember anatomical relationships. There were 25 points on visual memory and 25 points on memory for content of the written discussion of the drawing.

Test 4 contained a short selection measuring the student's ability to recognize words that were spelled incorrectly.

Test 5 was designed to measure the student's ability to draw logical conclusions from a given set of data. Much of his future work in medicine would depend



on such ability.

Test 6 was a specialized intelligence test based on the student's knowledge of premedical work and his general reading and information. It is only logical that the more familiar the student is with medical and scientific terms, the more likely he will be to succeed in the medical course. Moreover, if he has had an interest in medicine, one would expect him to have done some general reading along that line, and to have picked up, aside from his premedical course, a certain amount of information as indicated in his vocabulary. This test of 90 items gave a fairly good indication of the student's background, interest, and specialized knowledge in this scientific field.

Test 7 was designed to measure a student's ability to understand very difficult printed material when he had it constantly before him. In this instance, a passage such as he would find in any course in Physiology in medical school was selected. He had plenty of time to read the passage over and then refer to it as often as he wished in answering the ten questions. If he were unable to understand the passage, the chances are he will not understand similar passages in connection with his medical course.

There is one element, however, to be considered in connection with this last test. Inasmuch as it was on the last sheet, the student who is by nature very slow may have consumed so much time on the other tests that he would not do himself justice on this particular test. In general,



the student who is slow will also be handicapped when he gets to medical school, because in the medical curriculum as, probably, in no other professional course, the student is so loaded with material, that if he is extremely slow he will find it impossible to master the work. While the series of tests which make up the Medical Aptitude Test as a whole are not designed as speed tests, it is inevitable that the rate of learning should be a factor in determining the final score. Also, while the assignments in the medical course are not designed to force the average student to work faster than his normal rate, it is inevitable that the slow student would have to work faster than his normal rate in order to keep up with the medical assignments. In other words, if one student can learn a given assignment in two hours, whereas it takes another four hours to learn the same assignment, it is quite obvious that the fast learner will have twice as much time to put on his other assignments as will the slow student.

Form 8 of the Aptitude Test for Medical Schools contained the following tests:

<u>Test</u>	<u>Method of Scoring</u>	<u>Name of Part</u>	<u>Total Possible</u>
1	R-W	General Information	110
2	No. R	Scientific Vocabulary	90
3	R-W	Spelling	40
4	R-W x 2	Logical Reasoning	40
5	No. R x 3	Understanding of Printed Material	90
Total			370





Test 1, as the name implies, was designed to measure a student's general cultural background. It consisted of selected items from the fields of History, Literature, Government, General Science, Economics, Sports, and Transportation. In addition, certain items designed to measure Social Intelligence, or the student's ability to get along with others, were included. This was the first year in which this type of test was included. It met the widespread demand from many admission officers that some part of the Medical Aptitude Test should indicate the cultural background of the student as contrasted with the more technical which he would get in his required premedical training in Biology, Chemistry, and Physics.

Test 2 was a specialized intelligence test similar to Test 6 on Form 7.

Test 3 was a spelling test similar to Test 4 on Form 7.

Test 4 was a test on logical reasoning similar to Test 5 on Form 7.

Test 5 was designed to measure a student's ability to understand very difficult printed material when he had it constantly before him, as in Test 7 on Form 7. However, the amount of material was double the amount on Form 7. Two passages were chosen, one from Pharmacology and one from Obstetrics.





Form 9 of the Aptitude Test was very similar to Form 8. It was comprised of 5 tests marked as follows:

<u>Test</u>	<u>Method of Scoring</u>	<u>Name of Part</u>	<u>Total Possible</u>
1	R-W	General Information	110
2	No. R	Scientific Vocabulary	90
3	R-W	Spelling	50
4	R-W x 2	Logical Reasoning	40
5	No. R x 3	Understanding of Printed Material	90
			<hr/>
			Total 380

Form 10 had 7 separate tests marked as follows:

<u>Test</u>	<u>Method of Scoring</u>	<u>Name of Part</u>	<u>Total Possible</u>
1	R-W	Comprehension and Retention	40
2	No. R	Visual Memory	25
3	R-W	Memory for Content	25
4	R-W	General Information	110
5	R-W x 2	Logical Reasoning	60
6	No. R	Scientific Vocabulary	90
7	No. R x 3	Understanding of Printed Material	45
			<hr/>
			Total 395

A preliminary study sheet was used on Form 7, discontinued on Forms 8 and 9, and then used again on Form 10. The preliminary study sheet on Form 10 contained



reading matter and an anatomical drawing. The student studied it for thirty minutes. At the end of that time the study sheets were collected and questions based on the material studied were answered in Tests 1, 2, and 3.

Tests 4, 5, 6, and 7 were similar to those on earlier forms.

Form 12 was very similar to Form 10. It contained the following parts:

<u>Test</u>	<u>Method of Scoring</u>	<u>Name of Part</u>	<u>Total Possible</u>
1	R-W	Comprehension and Retention	40
2	No. R	Visual Memory	25
3	R-W	Memory for Content	25
4	R-W	General Information	110
5	R-W x 2	Logical Reasoning	50
6	No. R	Scientific Vocabulary	90
7	No. R x 3	Understanding of Printed Material	45
			<hr/> Total 385

On Form 13 the test measuring the student's general cultural background was substituted by Test 4 which was primarily a premedical information test. As a result of a special study of the predictive value of individual items on former tests, it was found that questions taken directly from the premedical sciences have a much higher selective value than do general cultural questions based on a knowledge



of Art, History, Music, Literature, etc. Therefore, on Form 13 questions on premedical work and of general scientific interest were used primarily. Form 13 was marked as follows:

<u>Test</u>	<u>Method of Scoring</u>	<u>Total Possible</u>
1	R-W	40
2	No. R	25
3	R-W	25
4	R-W	110
5	R-W x 2	50
6	No. R	90
7	No. R x 3	60
Total		400

### Subjects

The records of six successive classes entering the University of Alberta from 1934 to 1939 were used. During that time 211 students took the test. However, only 129 completed first year medicine. The rest failed to enter medical school or dropped out during the first year.

The 129 cases used in this study were classified as follows:

- (a) 33 who completed 4 years of medicine,
- (b) 30 who completed 3 years of medicine,
- (c) 32 who completed 2 years of medicine,
- (d) 34 who completed 1 year of medicine.



Group (a) entered medical school in 1934 and 1935, group (b) in 1936, group (c) in 1937, and group (d) in 1938.

The total numbers who wrote each form of the test in the United States and Canada are also included in this study. They are as follows:

- (a) Those who wrote Form 7 in 1934 - 10569
- (b) Those who wrote Form 8 in 1935 - 10671
- (c) Those who wrote Form 9 in 1936 - 10853
- (d) Those who wrote Forms 10 & 11 in 1937 - 10755
- (e) Those who wrote Form 12 in 1938 - 10411

### Methods

In determining the predictive value of the Moss Aptitude Test for Medical Schools various methods have been used.

The average marks obtained by students on first year medicine, the first two years of medicine, the first three years of medicine, and on four years of medicine were correlated with the corresponding Medical Aptitude Test scores. Further, the average marks of students in each of the four years of medicine were correlated with their Medical Aptitude Test scores. Finally, the average marks for the four years of medicine of the group entering in 1934 and the group entering in 1935 were correlated separately with the Aptitude Test scores, the average marks for three years of medicine for the 1936 group were correlated with





test scores, and the average marks for two years of medicine for the 1937 group were correlated with the test scores.

The correlation formula used was:

$$r = \frac{\frac{\sum xy}{N} - C_x C_y}{\sigma_x \sigma_y}$$

To test the significance of correlation coefficients the theory of small samples was applied. Using the formula

$$t = \frac{r}{\sqrt{1 - r^2}} \cdot \sqrt{n - 2}, \quad \text{where } r = \text{correlation}$$

coefficient,  $n$  = the number of subjects, and  $t$  = Fisher's  $t$ ; and by use of Fisher's Table for  $t$  the probability that such a correlation would occur by random sampling from an uncorrelated population was calculated. If this probability worked out to be low ( less than 0.05 ) the correlation was regarded as significant.

A study was then made of the distribution of all test scores. The range of marks, medians, etc. made by the University of Alberta students were compared with those made by the total number who wrote the test.

The frequency of failures in courses ( marks below 60% ) was compared with the Aptitude Test scores.

The medical school performance of those who had completed first year medicine and of those who had completed second year medicine was compared with the corresponding



### Aptitude Test scores.

When the test score results were submitted to the University of Alberta by the Association of American Medical Colleges, total scores, scores on each part of the test, and percentile ratings were given. The percentile rating indicated the relative standing of the student as compared with the total number who took the test. For the last years the number taking the test has been about 10,500 on each form.

Since the number writing the test at the University of Alberta was relatively small, these percentile ratings were now compared with the scholastic performance in first year medicine, in second year medicine, and in the first two years of medicine.

The students were then classified according to their achievement in medical school to see how the best and poorest students in medical school rated on the Aptitude Test.

A study was made of the Medical Aptitude Test scores of those who entered medical school at the University of Alberta as compared with the scores of those who wrote the test at the U.of A. and did not enter.

Lastly, Medical Aptitude Test scores and scholastic achievement were compared with achievement on the Thurstone Psychological Examination.

Since the total possible score on each form of the



Medical Aptitude Test was different, all Medical Aptitude Test scores were reduced to percentages for this study. All university marks were also reduced to percentage averages.

Throughout this study the subjects have been divided at times into ten groups according to performance. The lowest tenth was taken as those who rated below the first decile, the second tenth between the first and second decile, and so on.

$Q_1$  was taken as lower than  $Q_2$ , and  $Q_2$  lower than  $Q_3$ .



CHAPTER III  
SUMMARY OF DATA  
Correlations

Medical Aptitude Test scores were correlated with scholastic achievement and the findings are tabulated in Table III.

TABLE III  
CORRELATIONS BETWEEN MEDICAL APTITUDE TEST SCORES AND  
SCHOLASTIC ACHIEVEMENT

Medical Aptitude Test Scores correlated with	Number of cases	r	P
4 years of medicine	33	0.27	0.14
3 years of medicine	63	0.25	0.04
2 years of medicine	95	0.33	0.001
1 year of medicine	129	0.22	0.015
4th year medicine	33	0.03	0.88
3rd year medicine	63	0.16	0.19
2nd year medicine	95	0.33	0.001
1934 class on 4 years of medicine	18	0.21	0.4
1935 class on 4 years of medicine	15	0.53	0.04
1936 class on 3 years of medicine	19	- 0.23	0.35
1937 class on 2 years of medicine	24	0.17	0.44
1938 class on 1 year of medicine	21	0.34	0.15

r - Correlation Coefficient

P - Probability Coefficient using Fisher's t





## Distribution of Total Scores

A study was next made of the range of marks, medians, etc. made by the total number of students writing the test with the range of marks, medians, etc. made by the students who wrote the same form of the test in the same year at the University of Alberta. Of the 211 who wrote the test at the University of Alberta 82 either failed to complete the first year of medicine or did not enter medical school at this university.

During the year 1934-35 10569 students were tested in 615 colleges throughout the United States and Canada on Form 7 of the test. At the University of Alberta 39 students wrote the test and their total scores ranged from 29% to 69%. The median score was 48%, one half of those taking the test falling above this and one half below. The mean was 47.9%. The highest quarter made above 52.5%; the lowest quarter below 42.5%. Unfortunately, the medians, etc. for the total group writing this form of the test are not available.

During the year 1935-36 10671 students were tested on Form 8 in 628 colleges. The median score was 59.2%. The highest quarter made above 69.2%; the lowest quarter below 48.4%. At the University of Alberta 30 students wrote the test and made total scores ranging from 32% to 86%. The median score was 48%. The highest quarter made above 57%; the lowest quarter below 41%. The mean was 50%.



In 1936-37 10853 students were tested in 627 colleges on Form 9. The total scores ranged from 10% to 98%. The median score was 68.4%. The highest quarter made above 77.9%; the lowest quarter below 58.2%. At the University of Alberta 35 students wrote Form 9 and the total scores ranged from 31% to 86%. The median score was 66%. The highest quarter made above 71.5% ; the lowest quarter below 54%. The mean was 63.9%.

During the year 1937-38 10755 students were tested in 628 schools. The total scores made on Forms 10 and 11 ranged from 8% to 93%. The median score was 59.2%; the highest quarter made above 69.4%; the lowest quarter below 49.1%. At the U. of A. 61 students wrote Form 10. The total scores ranged from 29% to 82%. The median score was 53%; the highest quarter made above 60%; the lowest quarter below 44%. The mean was 52.8%

During the year 1938-39 10411 students were tested on Form 12 in 621 schools. The total scores ranged from 9% to 95%. The median score was 67.6%; the highest quarter made above 71.4%; the lowest quarter below 52.9%. At the U. of A. 46 students wrote Form 12. Their total scores ranged from 36% to 84%. The median score was 63.5%; the highest quarter made above 70%; the lowest quarter below 51%. The mean was 61%.

In 1939-40 10459 students were tested on Form 13 in 623 colleges. At the U. of A. 68 students wrote this form and their marks ranged from 28% to 88%. The median was 58%;  $Q_3$  was 70.5%;  $Q_1$  was 52%. These data are summarized in Table IV.



TABLE IV  
DISTRIBUTION OF TOTAL SCORES

Form		7	8	9	10&11	12	13
Year		1934	1935	1936	1937	1938	1939
Number Writing	U.of A.	39	30	35	61	46	68
	Total group	10569	10671	10853	10755	10411	10459
Range of Marks	U.of A.	29-69	32-86	31-86	29-82	36-84	28-88
	Total group			10-98	8-93	9-95	
Median ( $Q_2$ )	U.of A.	48	48	66	53	63.5	58
	Total group		59.2	68.4	59.2	67.6	
Highest Quarter above ( $Q_3$ )	U. of A.	52.5	57	71.5	60	70	70.5
	Total group		69.2	77.9	69.4	71.4	
Lowest Quarter below ( $Q_1$ )	U.of A.	42.5	41	54	44	51	52
	Total group		48.4	58.2	49.1	52.9	
Mean	U.of A	47.9	50	63.9	52.8	61	58.9

All marks are percentages.



# Medical Aptitude Test Scores of Students Failing in One or More Subjects in Medical School

A study was made of the M.A. scores of those who failed in one or more subjects in first, second, third, and fourth year of medicine. The results are tabulated in Table V.

TABLE V

## MEDICAL APTITUDE TEST SCORES OF STUDENTS FAILING SUBJECTS IN MEDICAL SCHOOL

Medical Year	No. of Subjects failed	No. of Cases	Average M.A. Scores
1st	0	97	56.6%
	1	19	54.5%
	2	3	48.0%
	3	7	49.3%
	4	3	57.7%
	Total-129		55.7% Average for whole group
2nd	0	48	57.7%
	1	29	55.1%
	2	12	52.3%
	3	1	39.0%
	4	5	49.0%
	Total-95		55.6% Average for whole group





TABLE V (cont.)

Medical Year	No. of Subjects failed	No. of Cases	Average M.A. Scores
3rd	0	29	58.0%
	1	7	53.9%
	2	15	54.0%
	3	6	59.7%
	4	4	43.7%
	5	2	40.0%
		Total-63	55.3% Average for whole group
4th	0	19	49.8%
	1	4	53.3%
	2	5	55.8%
	3	2	48.0%
	4	3	48.7%
		Total-33	50.9% Average for whole group



## Comparison of Scholastic Achievement with Medical Aptitude Test Scores

The medical school marks of the three largest groups (one year of medicine, two years of medicine, and second year of medicine) were compared with the corresponding M.A. scores. The cases were divided into ten equal groups on the basis of their percentage scores on the Medical Aptitude Test. Tables VI, VII, and VIII show medical school performance at various test score levels for those who have completed one or two years of medicine.

### TABLE VI

MEDICAL SCHOOL PERFORMANCE IN FIRST YEAR MEDICINE AT  
VARIOUS APTITUDE TEST SCORE LEVELS  
No. of cases - 129

Medical Aptitude Test Scores	Average Scholastic Marks
Highest tenth of class	75.2%
9th           "           "	72.5%
8th           "           "	76.0%
7th           "           "	72.1%
6th           "           "	69.5%
5th           "           "	67.9%
4th           "           "	67.3%
3rd           "           "	71.3%
2nd           "           "	69.2%
Lowest tenth of class	67.2%



TABLE VII

MEDICAL SCHOOL PERFORMANCE IN SECOND YEAR MEDICINE AT  
VARIOUS APTITUDE TEST SCORE LEVELS  
No. of cases - 95

Medical Aptitude Test Scores	Average Scholastic Marks
Highest tenth of class	72.6%
9th " "	73.2%
8th " "	73.0%
7th " "	73.1%
6th " "	68.0%
5th " "	69.3%
4th " "	69.3%
3rd " "	68.4%
2nd " "	69.7%
Lowest tenth of class	65.9%

TABLE VIII

MEDICAL SCHOOL PERFORMANCE FOR FIRST TWO YEARS OF MEDICINE  
AT VARIOUS APTITUDE TEST SCORE LEVELS  
No. of cases - 95

Medical Aptitude Test Scores	Average Scholastic Marks
Highest tenth of class	73.7%
9th " "	72.5%
8th " "	72.7%
7th " "	72.4%
6th " "	68.6%
5th " "	69.0%
4th " "	68.6%
3rd " "	71.2%
2nd " "	69.6%
Lowest tenth of class	66.8%



# Comparison between Percentile Ratings on Medical Aptitude Test and Scholastic Achievement

The percentile rating given a student is based upon his performance in comparison with the total number who wrote the test at the same time. (e.g. In 1935-36 10671 wrote Form 8 of the test.) Each year a new form was used and it is assumed that a student writing on one particular form would attain a percentile rating which would be very close to the percentile rating he would receive if he had written any one of the other forms.

Tables IX, X, and XI show the medical school performance of various groups at the University of Alberta in comparison with their percentile rating on the M.A. test.

TABLE IX

COMPARISON BETWEEN PERCENTILE RATINGS ON MEDICAL APTITUDE TESTS AND SCHOLASTIC ACHIEVEMENT FOR FIRST YEAR MEDICINE  
No. of cases - 129

Percentile Rating on M.A. Test	No. of cases	Average Scholastic Mark
91 - 100	4	72.3%
81 - 90	6	73.2%
71 - 80	5	76.0%
61 - 70	19	73.8%
51 - 60	13	73.2%
41 - 50	16	71.6%
31 - 40	17	68.9%
21 - 30	13	67.3%
11 - 20	20	69.1%
1 - 10	16	68.8%





TABLE X

COMPARISON BETWEEN PERCENTILE RATINGS ON MEDICAL APTITUDE TESTS AND SCHOLASTIC ACHIEVEMENT FOR SECOND YEAR MEDICINE  
No. of cases - 95

Percentile Rating on M.A. Test	No. of cases	Average Scholastic Mark
91 - 100	3	73.3%
81 - 90	5	72.4%
71 - 80	2	65.5%
61 - 70	14	72.3%
51 - 60	9	72.4%
41 - 50	12	71.3%
31 - 40	14	71.4%
21 - 30	12	67.8%
11 - 20	14	67.4%
1 - 10	10	68.7%

TABLE XI

COMPARISON BETWEEN PERCENTILE RATINGS ON MEDICAL APTITUDE TESTS AND SCHOLASTIC ACHIEVEMENT FOR FIRST TWO YEARS OF MEDICINE. No. of cases - 95

Percentile Rating on M.A. Test	No. of cases	Average Scholastic Mark
91 - 100	3	73.7%
81 - 90	5	70.8%
71 - 80	2	65.0%
61 - 70	14	72.8%
51 - 60	9	73.1%
41 - 50	12	70.9%
31 - 40	14	71.0%
21 - 30	12	67.9%
11 - 20	14	68.8%
1 - 10	10	69.6%



# Comparison of Medical Aptitude Test Scores with Scholastic Achievement

In this study the groups were classified according to their achievement in medical school to see how the best and poorest students rated on the Aptitude Test. The study was carried out for first and second year medicine and the findings are tabulated in Tables XII and XIII.

TABLE XII

COMPARISON OF MEDICAL APTITUDE TEST SCORES WITH SCHOLASTIC ACHIEVEMENT FOR FIRST YEAR MEDICINE  
No. of cases - 129

Scholastic Achievement	Average Test Scores
Highest tenth of class	64.6%
9th " " "	59.9%
8th " " "	59.6%
7th " " "	54.2%
6th " " "	55.8%
5th " " "	55.4%
4th " " "	56.7%
3rd " " "	52.4%
2nd " " "	52.5%
Lowest tenth of class	48.7%



TABLE XIII

COMPARISON OF MEDICAL APTITUDE TEST SCORES WITH SCHOLASTIC  
ACHIEVEMENT FOR SECOND YEAR MEDICINE  
No. of cases - 95

Scholastic Achievement	Average Test Scores
Highest tenth of class	61.0%
9th " " "	63.0%
8th " " "	58.9%
7th " " "	59.9%
6th " " "	54.4%
5th " " "	51.4%
4th " " "	55.3%
3rd " " "	54.6%
2nd " " "	48.7%
Lowest tenth of class	48.2%

Medical Aptitude Test Scores of those who entered Medical  
School as compared with those who did not enter

It may be of interest to compare the Aptitude Test  
scores of students admitted to medical school at the  
University of Alberta in the years 1934 to 1938 with the  
scores of those who took the test but did not enter.

In 1934 the average M.A. Test score of all those  
admitted to medical school was 48.5%. The average of all  
those tested was 47.9%; the average of those who did not  
enter was 46.6%. The corresponding figures for the years  
1935 to 1938 are shown in Table XIV.



TABLE XIV

MEDICAL APTITUDE TEST SCORES OF THOSE WHO ENTERED MEDICAL  
SCHOOL AS COMPARED WITH THOSE WHO DID NOT ENTER  
( U. of A.)

Year	1934	1935	1936	1937	1938
No. who wrote the test	39	30	35	61	46
Average M.A. Test Scores	47.9	50.0	63.9	52.8	61.0
No. who entered Medical School	26	21	28	33	21
Average M.A. Test Scores	48.5	51.6	63.5	53.6	63.1
No. who did not enter	13	9	7	28	25
Average M.A. Test Scores	46.6	46.3	64.1	51.9	59.2

All M.A. Test Scores are percentages

#### Medical Aptitude Test Scores and Scholastic Achievement of Students in Terms of Achievement on the Thurstone Psycho- logical Examination

A study was made of the first and second year medical groups to determine what relationship, if any, existed between the Thurstone Psychological Test results and M.A. Test scores and scholastic achievement. The Psychological Test scores were taken from the records at the University of Alberta. On the basis of results obtained on the Thurstone Psychological Test, the students were given ratings from 1 to 10.





Those with a rating of 1 were in the lowest tenth of the group ( below the first decile ), those with a rating of 2 had scores between the first and second decile, etc.

These ratings from 1 to 10 were used in this study.

The findings are tabulated in Tables XV and XVI.

TABLE XV

MEDICAL APTITUDE TEST SCORES AND SCHOLASTIC ACHIEVEMENT OF  
FIRST YEAR MEDICINE GROUP COMPARED WITH PSYCHOLOGICAL TEST  
RATINGS      No. of cases - 124

Psychological Test Ratings	No. of Cases	Average M.A. Test Scores	Average Scholastic Achievement
10	10	72.6%	75.9%
9	13	60.9%	70.5%
8	22	61.3%	72.1%
7	9	57.7%	68.2%
6	18	56.9%	71.8%
5	14	51.2%	73.6%
4	14	53.4%	69.4%
3	9	42.4%	68.7%
2	8	43.6%	66.4%
1	7	42.4%	71.4%



TABLE XVI

MEDICAL APTITUDE TEST SCORES AND SCHOLASTIC ACHIEVEMENT OF  
SECOND YEAR MEDICINE GROUP COMPARED WITH PSYCHOLOGICAL TEST  
RATINGS No. of cases - 92

Psychological Test Ratings	No. of Cases	Average M.A. Test Scores	Average Scholastic Achievement
10	8	71.5%	73.8%
9	9	58.3%	71.7%
8	18	59.7%	71.1%
7	6	54.0%	64.2%
6	15	55.2%	71.0%
5	10	49.1%	71.0%
4	11	54.1%	67.9%
3	6	44.8%	71.3%
2	5	46.4%	68.0%
1	4	41.0%	68.8%



CHAPTER IV  
ANALYSIS OF DATA  
Correlations

It is seen from Table III that all the correlation coefficients are low, except where the average marks for the 1935-36 class on four years of medicine were correlated with the corresponding Medical Aptitude Test scores. Here the correlation coefficient is 0.53. However, the number of cases is only 15, which may account for the figure obtained. Where the number of cases is larger, i.e. 95 and 129, the correlation coefficients are lower.

By using Fisher's  $t$ , it was found that the correlation coefficients were barely significant where M.A. Test scores were correlated with average marks for 3 years of medicine (  $N = 63$ ,  $r = 0.25$  ), and with the 1935 class averages for 4 years of medicine (  $N = 15$ ,  $r = 0.53$  ), since  $P$  in each case was 0.04. The correlation was significant where M.A. Test scores were correlated with results for one year of medicine (  $N = 129$ ,  $r = 0.22$  ) since  $P$  was found to be 0.015. A definite significance was found for the correlations between M.A. Test scores and academic results for 2 years of medicine (  $N = 95$ ,  $r = 0.33$  ), and second year medicine (  $N = 95$ ,  $r = 0.33$  ). For both these two correlations the probability coefficient was found to be 0.001. This includes the three largest groups tested where the number of cases was 95 and 129.



It would seem that if a correlation does exist between Medical Aptitude Test scores and academic achievement the correlation coefficient would be low.

It is noted that there is a positive correlation throughout, except in one case. This would indicate that the test does predict scholastic achievement to a certain extent. However, because the correlation coefficients are low it would seem inadvisable to use the Moss Aptitude Test as a single criterion for admission to medical school.

Many students in this study with low Aptitude Test scores have successfully completed four years of medicine. For example: Subject #1 with a Medical Aptitude Test score of 29% completed his four years of medicine with an average of 71%. Subject #56 with a M.A. Test score of 38% completed four years of medicine with an average of 67%. On the other hand, it is also true that some with high M.A. Test scores made low marks in medical school. For example: Subject #94 with a M.A. Test score of 69% had an average of 55% on first year medicine and then did not continue with his course. Subject #207 with a M.A. Test score of 84% made an average of 69% on first year medicine. It is pointed out here that the highest M.A. Test score on record for this study for University of Alberta students is 86%.







## Distribution of Total Scores

Referring to Table IV, it is evident that the medians attained by the University of Alberta students were lower on every form than those for the total group. The differences range from 2.4% on Form 9 to 11.2% on Form 8.  $Q_1$  and  $Q_3$  were also lower in every case. The results seem to indicate that Canadian students are penalized on certain questions as compared with students in the United States. This is borne out by the fact that Dr. F.A. Moss, Director of the Study, has himself stated in his report to the University of Alberta on results on Form 8 that some general information questions on the test give an advantage to students in the United States as compared with those with a Canadian background.

On Form 10 of the test, Test 4 dealing with General Information has 22 questions of United States origin and 5 of British origin. This would penalize a Canadian student about 4% in writing the test. It is noted, however, that on Form 13 of the test, the General Information section was omitted, since it was found that it does not predict medical ability.

*How did the U of A student compare with general run on Form 13?*

On Forms 8 to 12 inclusive the median score of University of Alberta students is on the average 6% lower than that for the whole group.  $Q_3$  is more than 7% lower and  $Q_1$  nearly 5% lower. This may indicate that University of Alberta students are penalized on the test to the extent of about 6%.



# Medical Aptitude Test Scores of Students Failing in one or more Subjects in Medical School

Table V shows the average Medical Aptitude Test scores for those who had failed in one or more subjects in the various years of medicine. Of those who completed first year medicine, 97 out of 129 had no failures and had an average M.A. Test score of 56.6%. The average M.A. Test score for the total group was 55.7% which may indicate that the test score has little bearing on whether a student will fail in any of his courses. This is further borne out by

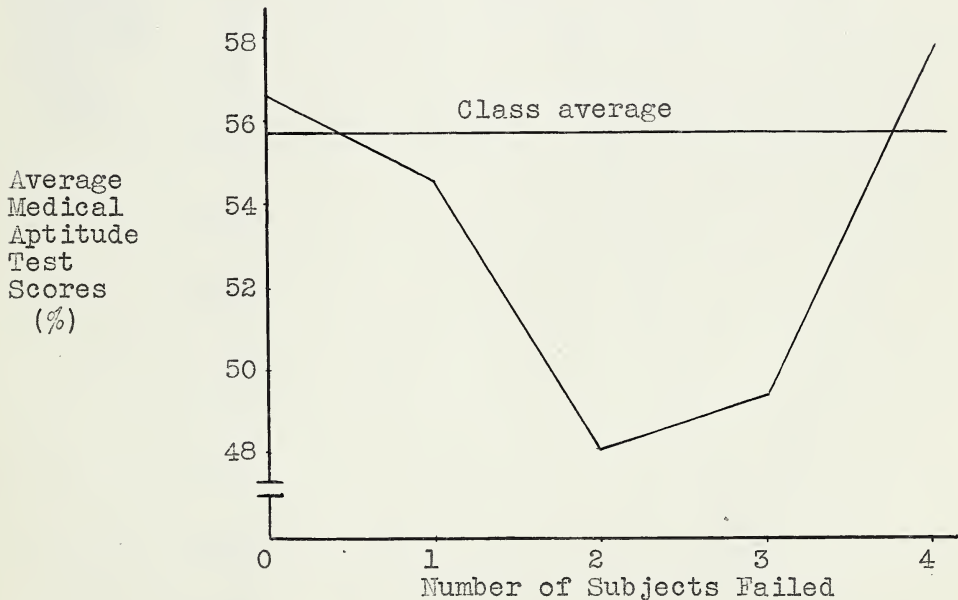


Figure 2. - Comparison of Medical Aptitude Test Scores of Students failing in one or more Subjects in first Year Medicine. No. of cases - 129



the fact that three students, who failed in four subjects each, had an average M.A. Test score of 57.7%, which is higher than the average for the whole group and also for the group who had no failures. The results are shown in Figure 2.

On second year medicine only, 48 out of 95 had no

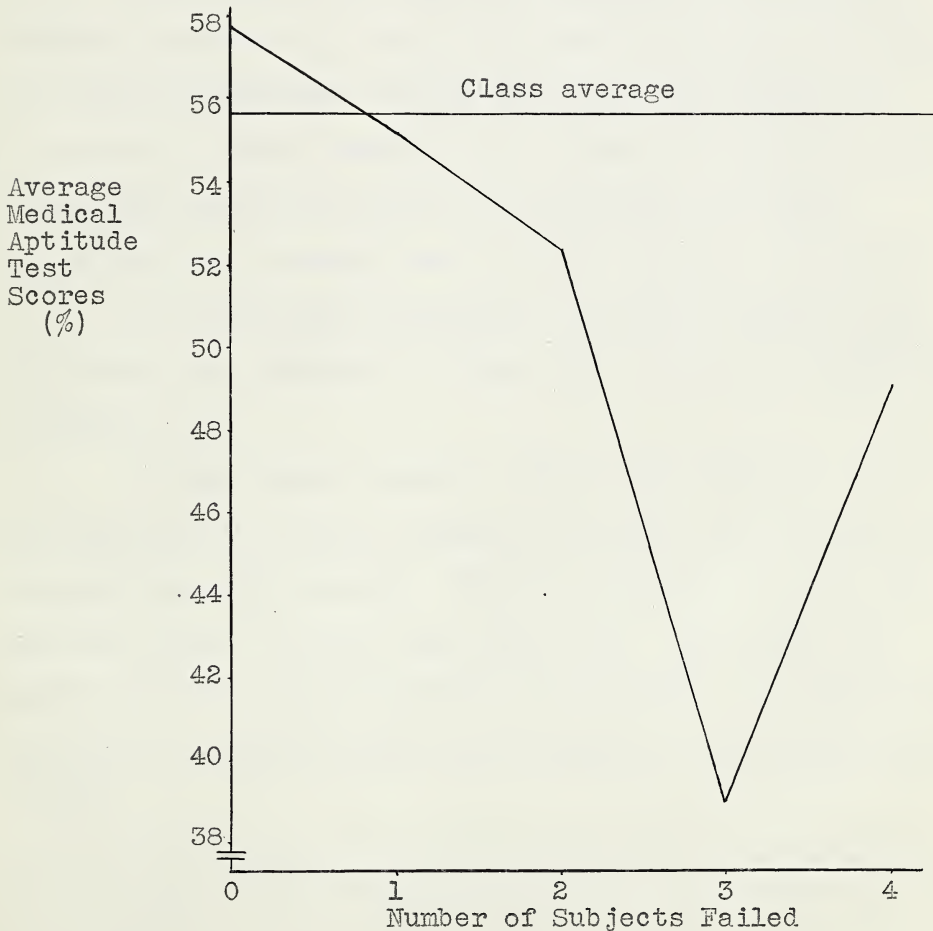


Figure 3.- Comparison of Medical Aptitude Test Scores of Students failing in one or more Subjects in second Year Medicine. No. of cases - 95



failures and had average M.A. Test scores of 57.7% which is higher than the average M.A. Test score of 55.6% for the whole group. There is a steady decline in the average M.A. Test scores as the number of failures increases except in the case of the student who failed in 3 subjects. The results are shown in Figure 3.

With third year medicine there is some tendency towards a decline in average M.A. Test scores as the number of failures increases, except for those who failed in 3 subjects. These students had a higher average M.A. Test score than those who failed in no subjects and also higher than the average for the whole group. ( Figure 4 )

In fourth year medicine the highest average M.A. Test score was obtained by those who failed in 2 subjects. ( Figure 5 )

In the largest group ( first year medicine ) no correlation was evident between the number of failures and average M.A. Test scores. This was also the case in the smallest group ( fourth year medicine). The other two groups showed a slight positive correlation. It would be difficult to predict what would happen if the numbers were larger.





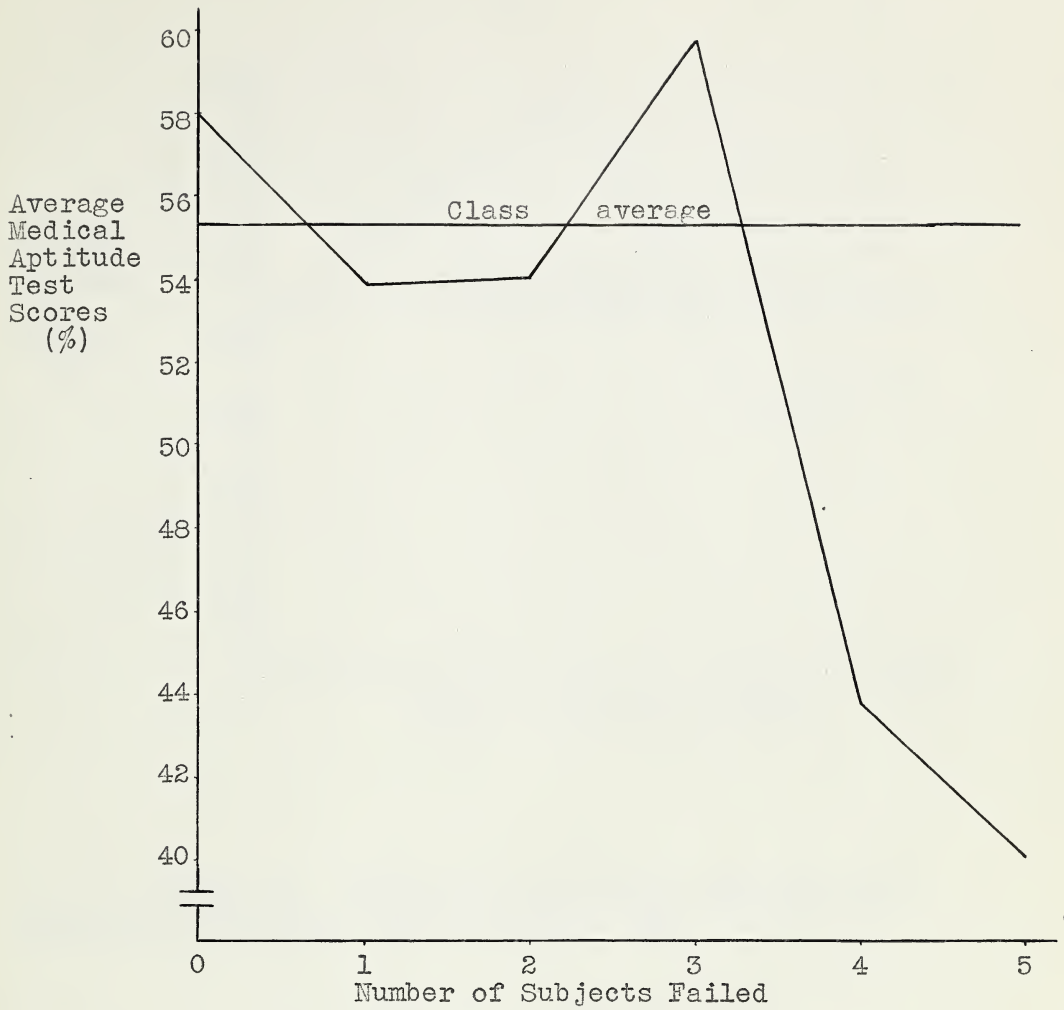


Figure 4.- Comparison of Medical Aptitude Test Scores of Students failing in one or more Subjects in Third Year Medicine. No. of cases - 63



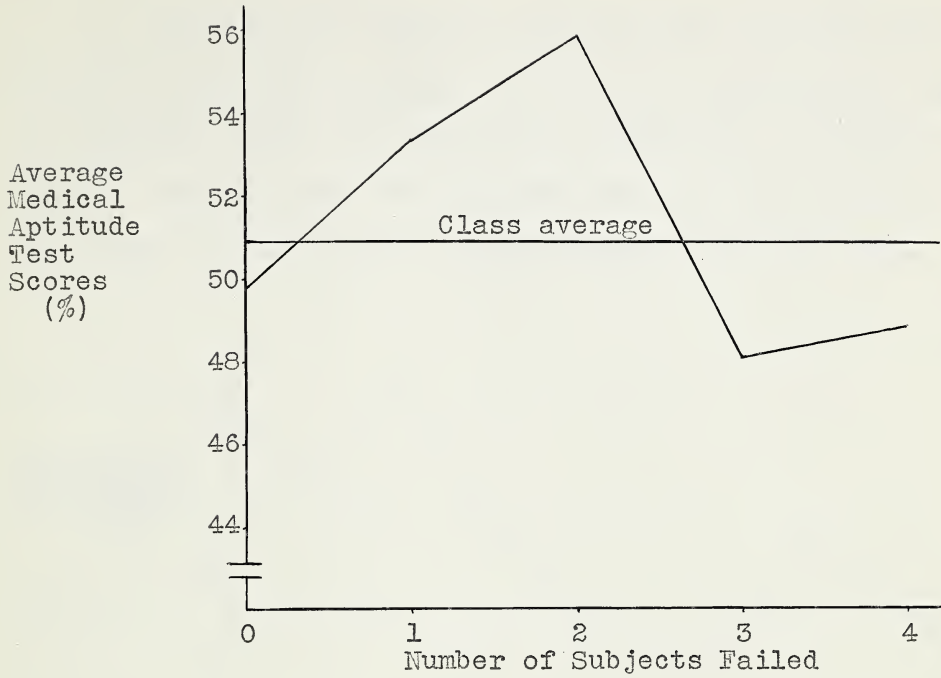


Figure 5.- Comparison of Medical Aptitude Test Scores of Students failing in one or more Subjects in Fourth Year Medicine. No. of cases - 33



## Comparison of Scholastic Achievement with Medical Aptitude Test Scores

How well the Medical Aptitude Test predicted the success of the 129 students in first year medicine is shown in Table VI. This is illustrated graphically in Figures 6 and 7. The students were divided into ten equal groups on the basis of their scores on the Medical Aptitude Test.

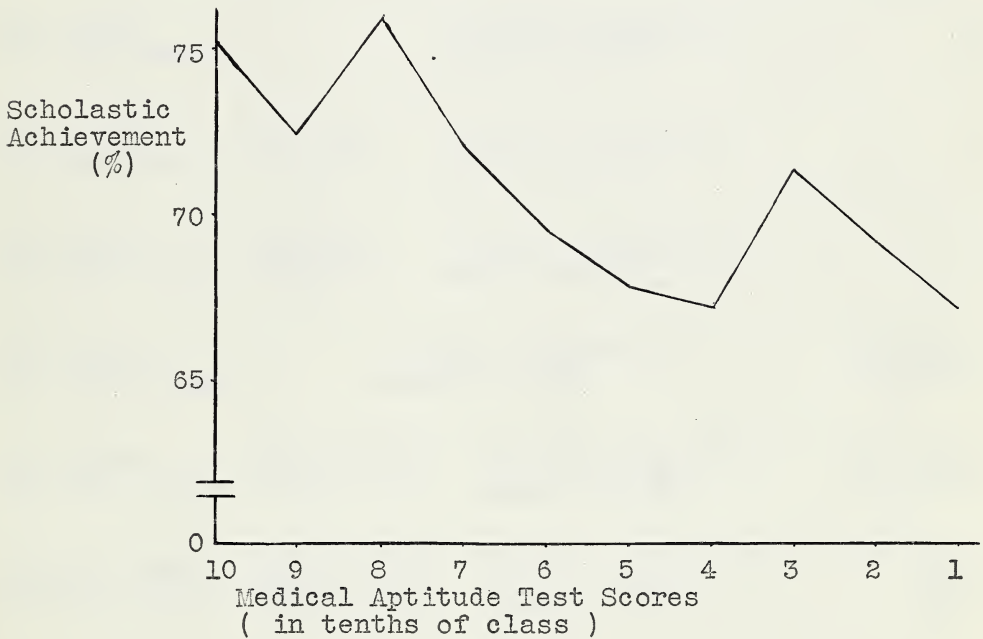


Figure 6.- Comparison of Scholastic Achievement for First Year Medicine with Medical Aptitude Test Scores.  
No. of cases - 129



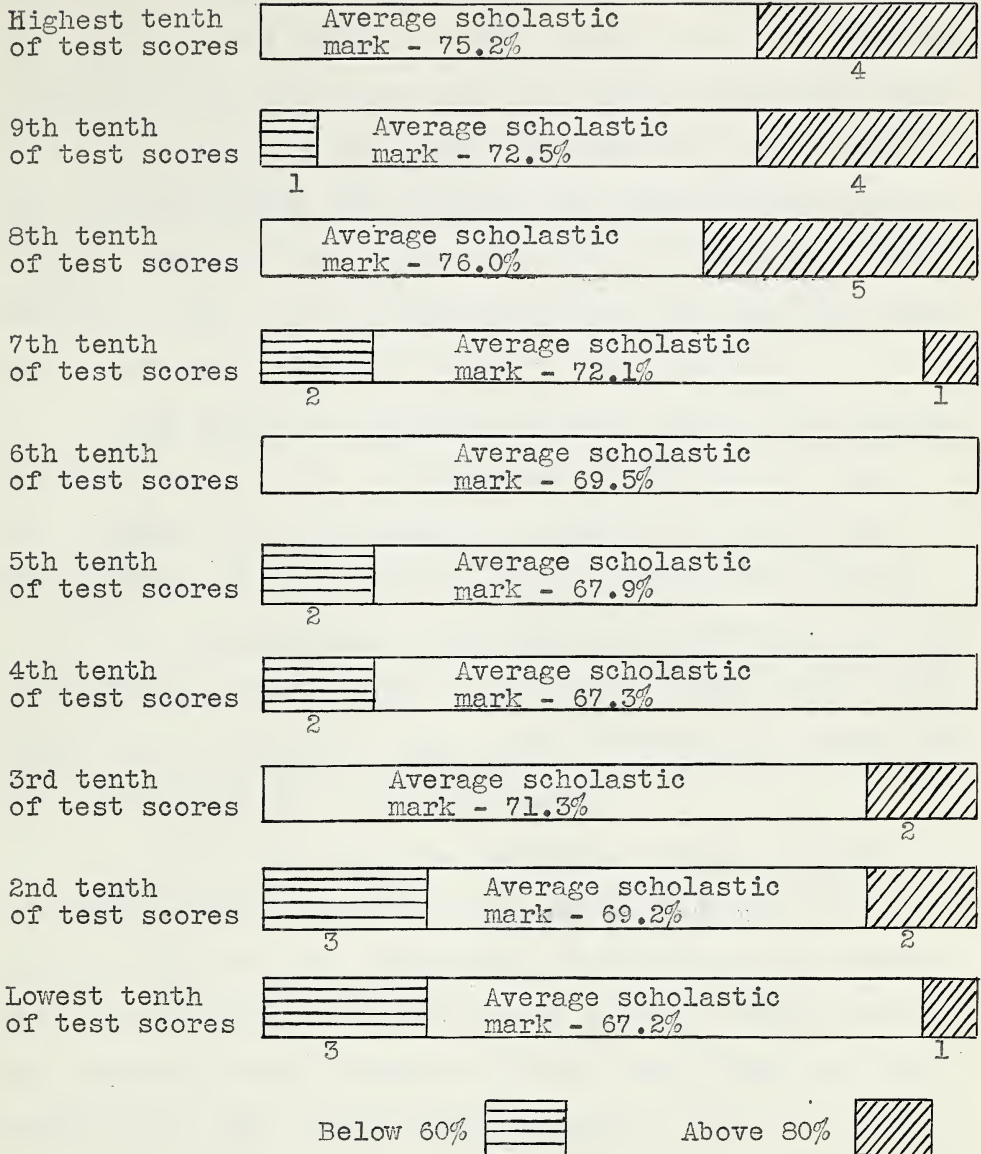


Figure 7.- Comparison of Scholastic Achievement for First Year Medicine with Medical Aptitude Test Scores, showing Distribution of Marks over 80% and below 60%.  
No. of cases - 129





Each bar ( Figure 7 ) shows the medical school average for each tenth of the group. In the highest tenth of those who completed first year medicine the average scholastic mark is 75.2%. In the lowest tenth the average mark is 67.2%. The highest average mark was made by those students whose Medical Aptitude Test scores fall in the 8th tenth. The decline in the average scholastic mark from the high tenth to the low tenth on test scores is not gradual.

The number of students in each tenth with failures ( average below 60% ) is indicated at the left of each bar ( Figure 7 ), the number of students who made over 80% in each tenth is indicated at the right of each bar.

It is noted that there are more receiving over 80% in the higher tenths than in the lower tenths of the class. There is an increase in the number of failures ( below 60% ) from the high tenth to the low tenth.

Out of the 129 cases mentioned above, 95 have completed second year medicine, and their scholastic results compared with their Medical Aptitude Test scores are shown in Table VII and Figures 8 and 9. Here again, the decline in the average scholastic mark from the high tenth to the low tenth is not gradual.



In the highest tenth there is only one mark over 80% and one failure; in the lowest tenth there are no marks over 80% and one failure ( Figure 9 ). Most of the high marks ( over 80% ) are found in the higher tenths and 3 of the 4 failures ( below 60% ) are in the three lowest tenths.

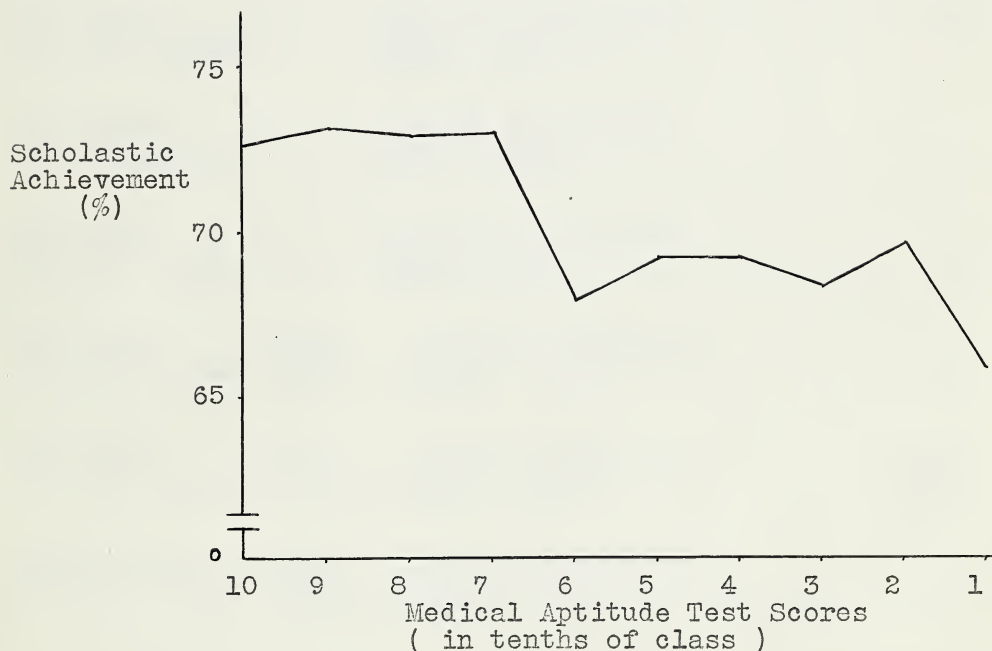


Figure 8.- Comparison of Scholastic Achievement for Second Year Medicine with Medical Aptitude Test Scores.  
No. of cases - 95



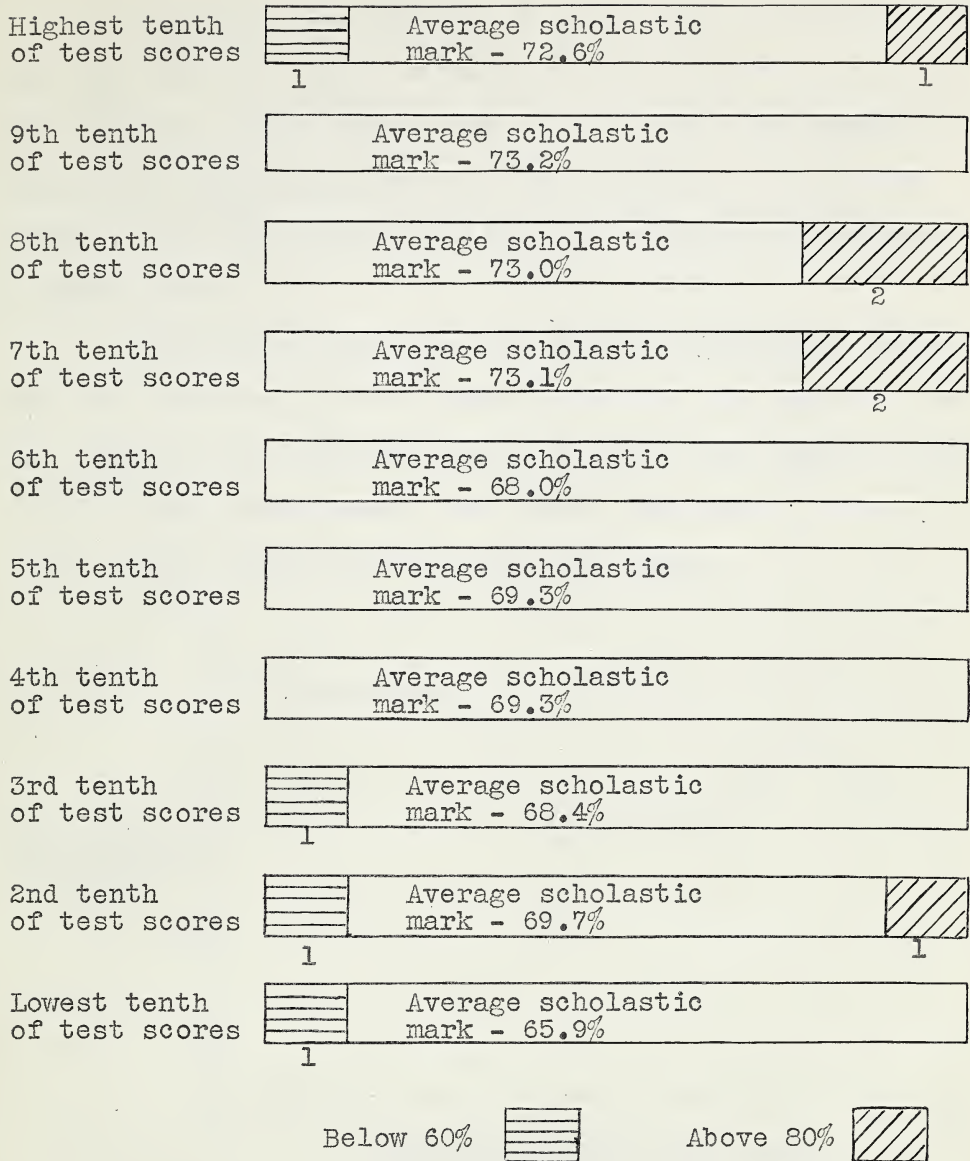


Figure 9.- Comparison of Scholastic Achievement for Second Year Medicine with Medical Aptitude Test Scores, showing Distribution of Marks over 80% and below 60%.  
No. of cases - 95



Analysing the results of the average scholastic marks for the first two years of medicine combined with the M.A. Test scores ( Table VIII ), it is seen that the average scholastic marks decrease from the highest to the lowest tenth in the test scores but this decrease is not gradual. ( Figure 10 )

Generally speaking, the highest scholastic marks are made by those in the higher tenths of the class on the M.A. Test but not necessarily by those in the highest tenth. In all three comparisons, the lowest scholastic marks are found in the lowest tenth on the M.A. Test.

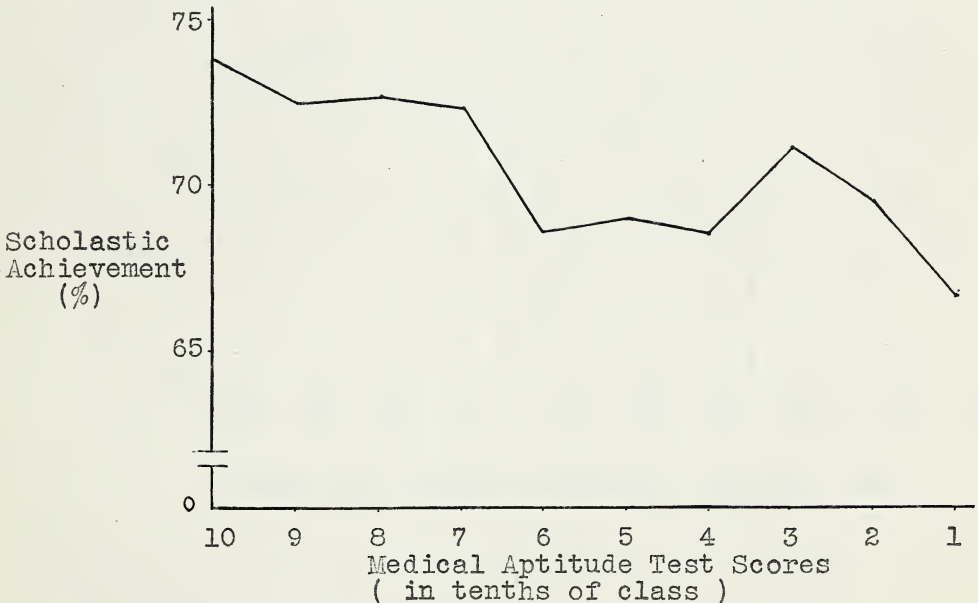


Figure 10.- Comparison of Scholastic Achievement for First and Second Year Medicine with Medical Aptitude Test Scores. No. of cases - 95





## Comparison between Percentile Ratings on Medical Aptitude Test and Scholastic Achievement

In all the studies up to this point the percentage M.A. Test scores were used for comparative purposes. In this study the percentile ratings of the students were used. The results are tabulated in Tables IX, X, and XI and graphed in figures 11, 12, and 13. It is interesting

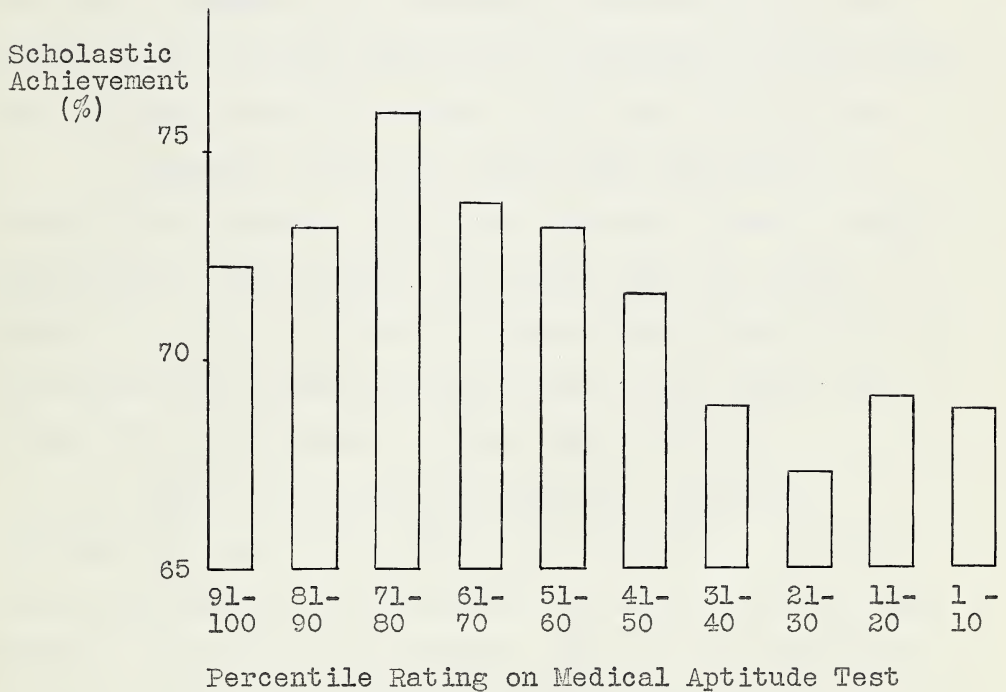


Figure 11.- Comparison between Percentile Ratings on Medical Aptitude Test and Scholastic Achievement for First Year Medicine. No. of cases - 129



to note that in the first year medicine group ( Table IX and Figure 11 ) the highest average in scholastic achievement was made by those who had percentile M.A. Test scores between 71 and 80 and that the highest ranking students as to M.A. Test scores had scholastic averages lower than the averages between 51 and 90 on percentile M.A. Test scores. No uniformity seems to exist at either extreme of the percentile range as to scholastic achievement but there seems to be a steady decline in achievement from the 80th to the 21st percentile rating on the M.A. Test scores.

However, it must be noted that the number of cases in the highest percentile brackets is small making the results there subject to a great deal of chance. Where the number of cases is larger there seems to be a correlation between percentile M.A. Test scores and scholastic achievement in first year medicine.

Table X and Figure 12 show the comparison between the percentile ratings on the Medical Aptitude Test and scholastic achievement for second year medicine. Here no correlation is evident. The 71 to 80 percentile group on the M.A. Test has only two cases so that not much emphasis can be placed upon it.



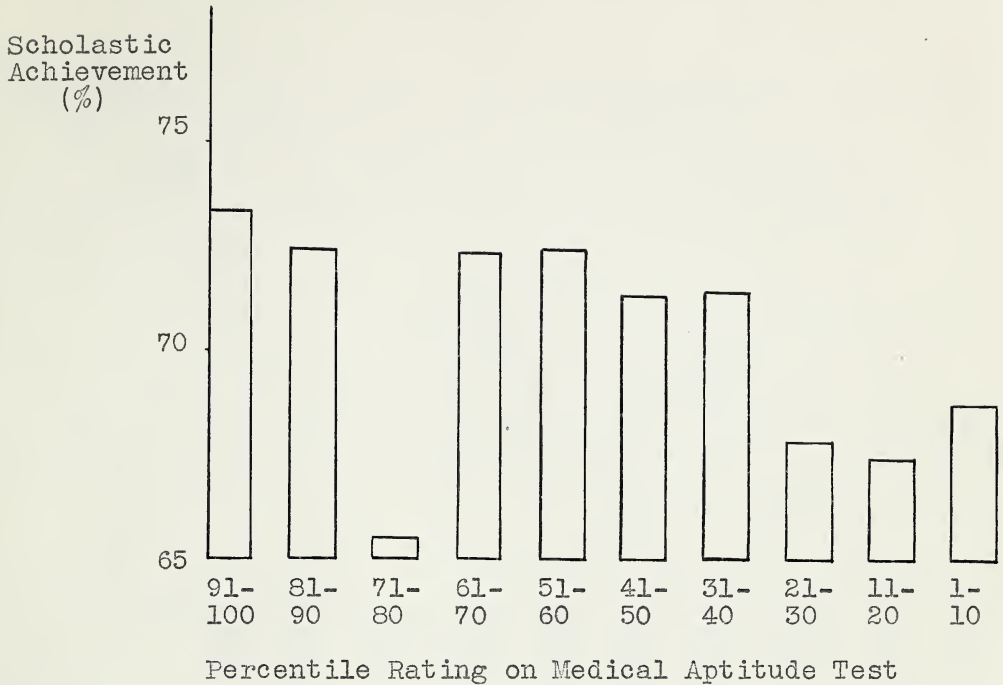


Figure 12.- Comparison between Percentile Ratings on Medical Aptitude Test and Scholastic Achievement for Second Year Medicine. No. of cases - 95

When the average scholastic marks for the first two years of medicine are compared with the percentile ratings on the Medical Aptitude Test, there is not much evidence of a correlation. The results are shown in Table XI and Figure 13.



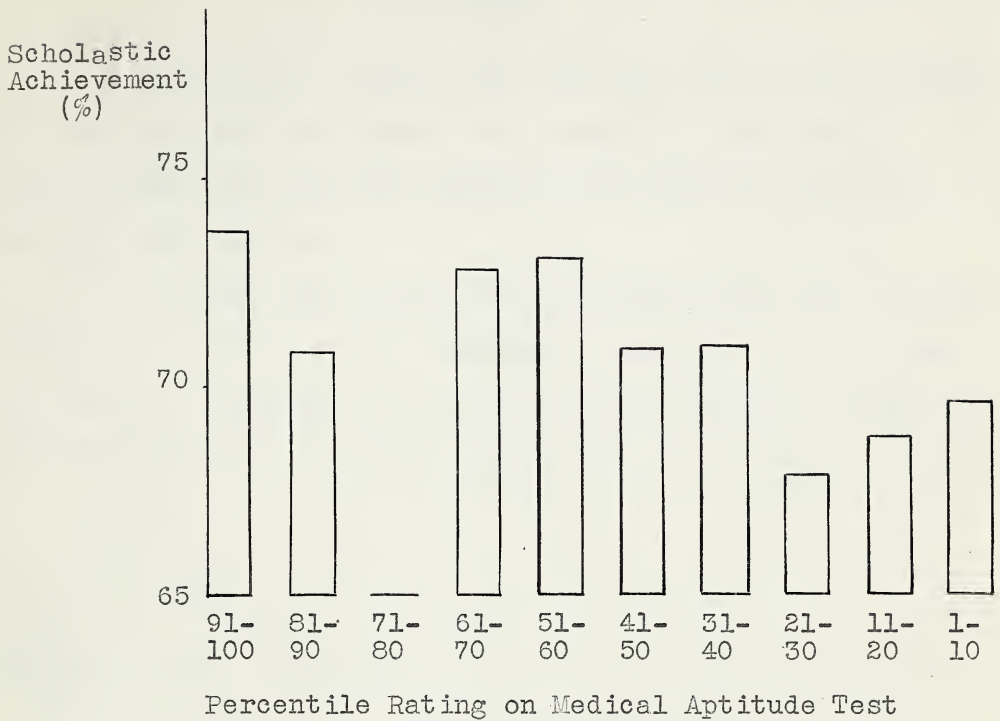


Figure 13.- Comparison between Percentile Ratings on Medical Aptitude Test and Scholastic Achievement for the First Two Years of Medicine. No. of cases - 95

On the whole there seems to be very little correlation between scholastic achievement and percentile rating on the Medical Aptitude Test.





## Comparison of Medical Aptitude Test Scores with Scholastic Achievement

Referring to Tables XII and XIII and Figures 14 and 15, one sees how the highest and lowest in scholastic achievement for first and second year medicine compared in M.A. Test scores.

In first year medicine the highest M.A. Test scores were made by those whose scholastic marks are in the highest tenth. Those who fell in the first ( lowest ) tenth on achievement had the lowest average M.A. Test scores. There

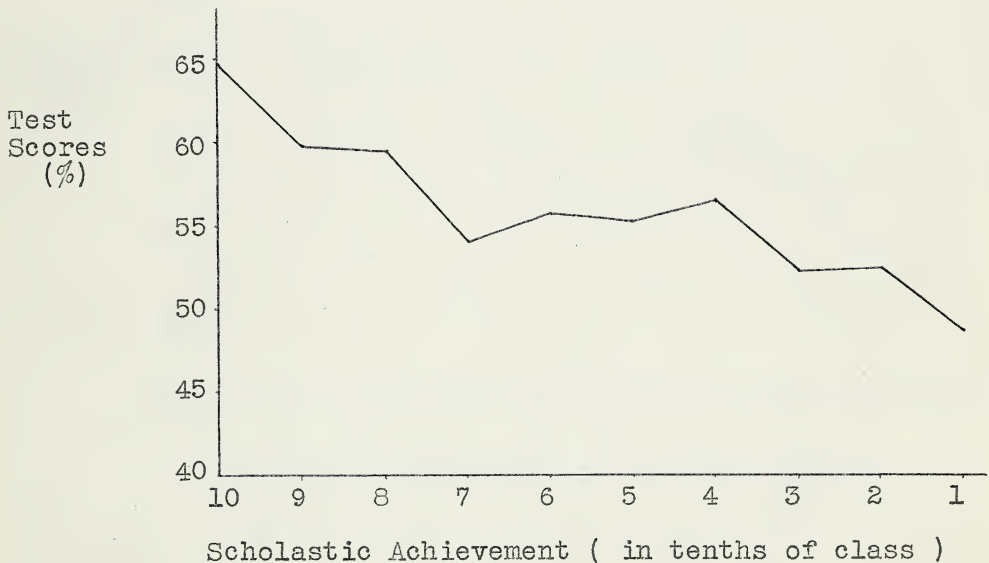


Figure 14.- Comparison of Medical Aptitude Test Scores with Scholastic Achievement in First Year Medicine.  
No. of cases - 129



is a decline in average M.A. Test scores from the highest to the lowest tenth in achievement.

In second year medicine the highest average test score was made by those in the 9th tenth of the class in achievement, whereas the highest tenth in achievement rated second on average M.A. Test scores. Again the lowest tenth in achievement rated lowest on average M.A. Test scores.

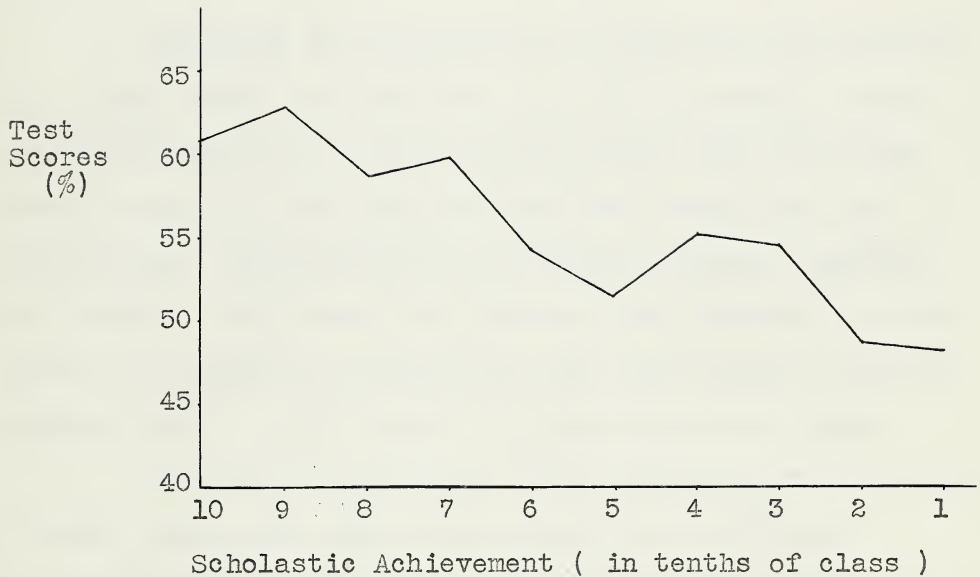


Figure 15.- Comparison of Medical Aptitude Test Scores with Scholastic Achievement in Second Year Medicine.  
No. of cases - 95



In both first and second year medicine the lowest tenth in achievement rated the lowest in M.A. Test scores. There seems to be some correlation between achievement and average M.A. Test scores although the decrease in M.A. Test scores from the highest to the lowest tenth in achievement is not regular.

Medical Aptitude Test Scores of those who entered Medical School as compared with those who did not enter

Referring to Table XIV it is seen that the average M.A. Test scores of those admitted to the medical school at the University of Alberta were higher each year than the averages for all who took the test except for the 1936 group. The differences in average scores, however, are slight. This seems to indicate that students who are admitted to medical school have M.A. Test scores slightly higher than those who take the test and do not enter.

Too much significance should not be placed in these results since many reasons unrelated to performance accounted for the withdrawal of these students from the University of Alberta or from a medical course.



Medical Aptitude Test Scores and Scholastic Achievement of  
Students in Terms of Achievement on the Thurstone  
Psychological Examination

In comparing Psychological Test ratings with M.A. Test scores some very interesting facts are evident. From Tables XV and XVI and Figures 16 and 17 one sees that there is a decided positive correlation between Psychological Test ratings and M.A. Test scores. There is a steady drop in average M.A. Test scores from the highest to the lowest rating on the Psychological Test. ( lower graphs in Figures 16 and 17 )

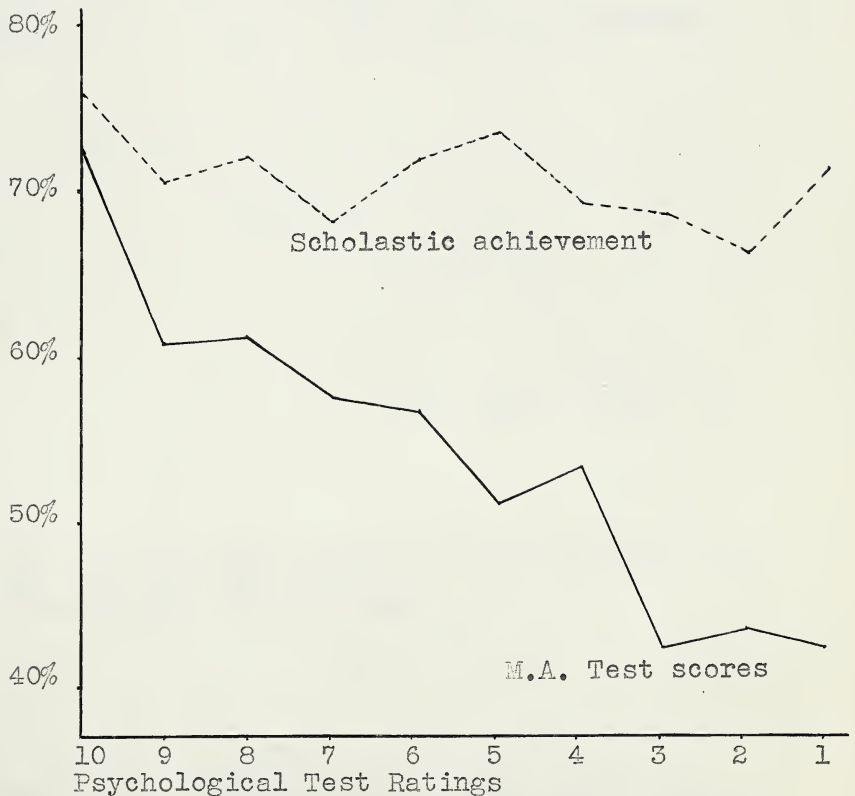


Figure 16.- Medical Aptitude Test Scores and Scholastic Achievement for First Year Medicine compared with Psychological Test Ratings. No. of cases - 124





In comparing Psychological Test ratings with scholastic achievement there appears to be little if any correlation since neither graph ( upper graph in Figures 16 and 17 ) falls off to the right to any appreciable extent. However, the average scholastic marks of the highest group on the Psychological Test are the highest in both comparisons.



Figure 17.- Medical Aptitude Test Scores and Scholastic Achievement for Second Year Medicine compared with Psychological Test Ratings. No. of cases - 92



It is interesting to note what might have happened if the students in the lowest quarter on the Moss Aptitude Test had been rejected each year.

In the 1934 group of 18 students who successfully completed four years of medicine, 4 were in the lowest quarter. They constituted 22% of the class completing four years of medicine in 1938. Their average marks for four years of medicine were 72%, 71%, 67%, and 63%, and the class average was 69%.

In the 1935 class completing four years of medicine in 1939, 3 out of 15 students had test scores in the lowest quarter. Their average marks for four years work were 67%, 66%, and 62%, and the class average was 68%.

Three out of 19 students in the 1936 class who completed three years of medicine in 1939 were in the lowest quarter, one of whom proved to be the best academically in his class. The three had averages of 68%, 71%, and 81% for three years of medicine, and the class average was 70%.



## CHAPTER V

### OTHER INVESTIGATIONS ON THE MOSS APTITUDE TEST

It might be interesting to note the findings and opinions of other investigators on the Moss Aptitude Test.

Dr. Torald Sollman<sup>1</sup> ( Western Reserve University ) states:

"I feel convinced that the test has demonstrated its reliability for what it pretends to do, which is to predict the chance of a man seeking to make good in a medical school. It does not predict that this man will surely make good. It says that this one has such-and-such a chance for making good, and that one has such-and-such a chance for doing badly, so far as scholastic ability is concerned. In that direction it has definitely demonstrated its reliability. I do not see how anyone can doubt it. Its value in that connection has evidently been recognized, for while it is not compulsory for the schools to use, practically all of the schools, 90 per cent or so, do use it. Its value is evidently recognized by the applicants, because ten thousand of them have paid their dollar and gone to the inconvenience of taking the test. Its value is evidently recognized by the premedical colleges, because some 640 give the test, and the number has increased year by year."

Dr. F.A. Moss<sup>2</sup> ( Director of Study, Committee on Aptitude Tests ) says:

"We have pointed out in every one of our previous reports that the test should be used only as an additional criterion. Where there is a high premedical grade and a low test score, or a high test score and a low premedical grade, you should be cautious of accepting the man. If both are high, you can easily admit him. If both are low,

---

<sup>1</sup>Journal of the Association of American Medical Colleges, 10, ( January 1935 ), p.42.

<sup>2</sup>Journal of the Association of American Medical Colleges, 10, ( January 1935 ), p.45.



you should have little hesitancy in refusing admission. But where there is a discrepancy, caution is indicated."

J.W. Cavett, Ph.D., A.T. Henrici, M.D., and S.B. Lindley<sup>3</sup>, Ph.D., University of Minnesota, Minneapolis, in their article, "Tests of Medical Aptitude at Minnesota", state:

"The Moss Medical Aptitude Test, of considerable value in many medical institutions, has proved to be quite ineffective as a basis for predicting the probable scholastic success of prospective students in the Medical School of the University of Minnesota . . . . . We are incapable of explaining the persistent failure of the Moss test to show the useful predictive values locally that it has shown in many other schools of the country."

Beverly Douglas<sup>4</sup>, Assistant Dean, Vanderbilt University School of Medicine, Nashville, Tennessee, made a study of the records of 191 students in the five successive classes from 1933 through 1937 and reported his results in "A Study of the Predictive Value of the Medical Aptitude Test at Vanderbilt School of Medicine". He writes:

"I feel that while it ( Moss Aptitude Test ) is an excellent index of a man's fitness to succeed in medical school, it should obviously not be regarded as a sole criterion by which he should be judged, any more than an x-ray alone should be considered an adequate basis on which to make a final diagnosis."

"It is perfectly certain that the personal rating forms, premedical grades and Aptitude Test scores,

<sup>3</sup>Journal of the Association of American Medical Colleges, 12, ( September 1937 ), p.257, p.266.

<sup>4</sup>Journal of the Association of American Medical Colleges, 13, ( November 1938 ), p.383.

Journal of the Association of American Medical Colleges, 16, ( July 1941 ), p.239.







when considered together, will give a more accurate prediction of a man's worth than will any single criterion or any two criteria."

Gideon S. Dodds<sup>5</sup>, Professor of Histology and Embryology, West Virginia University School of Medicine, Morgantown, West Virginia, studied the records of 443 students admitted to West Virginia University from 1932 to 1938 and reported his findings in the article, "Aptitude Test Scores, Premedical Grades, and First Year Medical Grades, During Six Years at West Virginia University". He worked out correlation Coefficients between Aptitude Test scores and first year medical grades. His results were:

1932 class -  $0.33 \pm 0.08$   
 1933 class -  $0.53 \pm 0.06$   
 1934 class -  $0.48 \pm 0.06$   
 1935 class -  $0.54 \pm 0.10$   
 1936 class -  $0.73 \pm 0.08$   
 1937 class -  $0.18 \pm 0.13$

In his summary he states:

"On the whole, the correlation between aptitude test scores and first year medical grades, and between premedical grades and first year medical grades was about equal, i.e., the predictive value of the aptitude test scores and premedical grades was about equal..... Though the coefficients of correlation give a measure of the average usefulness of both the aptitude test and premedical grades in the selection of students, it must be remembered that in case of each individual student these measures must be used with caution, on account of the wide range of grades for any given aptitude test score value."

---

<sup>5</sup>Journal of the Association of American Medical Colleges, 14, ( July 1939 ), p.221, pp.228-229



O.W. Hyman,<sup>6</sup> Dean, University of Tennessee College of Medicine, Memphis, Tennessee, made an analysis of the premedical and early medical records of all students admitted to the University of Tennessee College of Medicine from 1928 to 1938, about 1100 students. He reported his findings in the article, "Further Attempts to Improve Methods of Selecting Medical Students". He writes:

"At the University of Tennessee, our faculty believes that the premedical scholastic record is the most important single factor in determining whether an applicant will become a successful medical student. We realize that other factors, such as his medical aptitude record, health, age and financial resources are important also."

#### Report on Study at Stanford University:<sup>7</sup>

"In 1931, an independent study of the predictive value of the test was made by the officials of Stanford University and published in their Faculty Bulletin ( No.19, December 28, 1931 ). They found a correlation between premedical grades and medical school averages of 0.67, and between test scores and medical school averages of 0.64. The significant fact here is not that the premedical grades gave a slightly higher correlation than the test scores, but that both are so good. The correlation between the medical averages and a combined criterion of test scores and premedical grades is 0.81, an exceedingly high correlation for the combined criterion, and shows clearly that the combined criterion gives the best predictive value."

---

<sup>6</sup>Journal of the Association of American Medical Colleges, 15, ( May 1940 ), p.186.

<sup>7</sup>Journal of the Association of American Medical Colleges, 16, ( July 1941 ), p.237.



Study at George Washington University in 1932.<sup>8</sup>

An analysis of the test was made by the professor of statistics at George Washington University. He found the correlation coefficient between Medical Aptitude Test scores and medical school average grades to be 0.61.

Mary D. Salter,<sup>9</sup> Lecturer in Psychology, Faculty of Medicine, University of Toronto, studied the records of students entering first year medicine from 1937 to 1940. There were 473 subjects in all. She states:

"The Moss medical aptitude test has been given to students in first year medicine at the University of Toronto since 1937. With the first three classes, the scores were definitely related to first year grades, but not closely enough for acceptable accurate prediction. For the class entering in 1940, the relationship was slight. With no class was the aptitude test as closely related to first year grades as were high school grades.

A method of predicting academic success in the medical course has been devised and applied to four successive freshman classes, including 473 students in all. The high school grade and the medical aptitude score were combined by a statistical formula to give a predicted first year grade. The predictions were found to be closely related to subsequent academic success."

May Herrman,<sup>10</sup> Assistant to the Dean, Woman's Medical College, Philadelphia, Pennsylvania, in her article, "The Predictive Value of the Medical Scholastic

<sup>8</sup>Journal of the Association of American Medical Colleges, 16, ( July 1941 ), pp.237-238.

<sup>9</sup>Journal of the Association of American Medical Colleges, 17, ( September 1942 ), p.303, p.309.

<sup>10</sup>Journal of the Association of American Medical Colleges, 18, ( March 1943 ), p.117.





Aptitude Test at Woman's Medical College ", concludes by saying:

"The results of this study indicate that the medical scholastic aptitude test has predictive value at the Woman's Medical College. To a certain extent achievement in the College varies directly with the aptitude score....

It is clear that an extreme view of the test should be avoided. It is obvious that it is not worthless; every section of this study demonstrates its merits as a predictive measure. On the other hand, too much should not be expected. With the greatest care in the consideration of all entrance credentials, an admission committee, because of the ultimate uncertainty of personality, cannot forecast all applicants as good or poor risks. Therefore, all admission factors should be weighed carefully with the aptitude score one of the most important criteria."

As near as can be ascertained, no Canadian University is using the Moss Aptitude Test at present. The University of McGill used the test for several years and discontinued its use in 1938 since it was found that the predictive value of the test was not sufficient to warrant its use. The University of Toronto has devised a Medical Aptitude Test of its own which is used by its Medical School at the present time.





## CHAPTER VI

### CONCLUSIONS

1. It would seem that the Medical Aptitude Test does predict success in medical school to a very limited extent from the fact that, generally, positive correlations were found, but these correlations were low in most cases.

2. In general, the students with high Medical Aptitude Test scores are more successful in medical school than those with low scores.

3. The students with high academic standing in medical school have, on the average, the highest Medical Aptitude Test Scores.

4. The Medical Aptitude Test scores of University of Alberta students are consistently lower than those for the total group who wrote the test each year.

5. No conclusion can be drawn as to whether there is any relationship between M.A. Test scores and failures in individual subjects.

6. The chances of a student getting over 80% in scholastic work are better if he has a high Medical Aptitude Test score than if he has a low score. Also, his chances of getting below 60% are greater if he has a low M.A. Test score.



7. The average Medical Aptitude Test scores of those who entered medical school at the University of Alberta each year were higher than the average scores of those who wrote the test and did not enter.

8. There is a correlation between ratings on the Thurstone Psychological Examination and scores on the Moss Medical Aptitude Test.

9. There is no appreciable correlation between achievement on the Thurstone Psychological Examination and performance at medical school.

10. It would seem that the Moss Medical Aptitude Test could not be used as a single criterion for admission to medical school, but taken in conjunction with other factors it might have some value.



## BIBLIOGRAPHY

## Journal of the Association of American Medical Colleges

- Vol. 10, No.1. - January 1935
- Vol. 12, No.5. - September 1937
- Vol. 13, No.3. - May 1938
- Vol. 13, No.6. - November 1938
- Vol. 14, No.4. - July 1939
- Vol. 15, No.3. - May 1940
- Vol. 15, No.4. - July 1940
- Vol. 16, No.4. - July 1941
- Vol. 16, No.5. - September 1941
- Vol. 17, No.5. - September 1942
- Vol. 18, No.2. - March 1943

Statistical Methods for Research Workers - R.A. Fisher











